NIMS Science Objectives and Observational Plans for Ganymede during the Galileo Tour

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The Galileo spacecraft will first encounter Ganymede in May, 1996. This will commence a series of 32 observations in 5 orbits by the Near Infrared Mapping Spectrometer (NIMS) to achieve a range of science objectives. NIMS science objectives for these orbits are to study compositional units, terrain types, crater types, polar effects, leading and trailing hemisphere differences, and atmospheric composition. The main science objective for NIMS at Ganymede is to determine the chemical components in the various surface compositional units. This objective will be accomplished by a campaign to map almost the entire surface at ~100 km/pixel with 204 wavelengths covering the NIMS wavelength range of 0.7 to 5.2 micrometers. To identify spectral endmembers and provide more detailed compositional information, there are higher spatial and spectral resolution observations of various surface regions such as dark and bright areas. Terrains of different kinds will be observed to study their morphologies, for example the grooved terrain will be observed to study emplacement processes by tectonic or tidal sources. Craters of various types and ages will be studied, from palimpsests to dark- rayed craters. The composition of the exposed materials may reveal the nature of the subsurface materials. Ejects may show compositional correlations with size, **age,** latitude, terrain type, or longitude that would provide insight into their nature and origin. Volatile species may be found cold-trapped in Ganymede's polar caps. Such information from polar observations would provide some insight into the processes of frost deposition at high latitudes. Leading and trailing hemisphere observations to study the magnetospheric effects on the composition of surface materials will be made, for example, very dark albedo units are thought to be caused by surface modification from magnetospheric bombardment. Finally, NIMS will search for the presence of a tenuous oxygen atmosphere on Ganymede through limb observations of the a-X band.

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